Figures 5A and 5B show an exemplary frequency plan which can be used in conjunction with a transceiver of the present invention; and

Figure 6 shows an exemplary embodiment of an exciter which can be used in conjunction with a transceiver of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 shows an exemplary block diagram of a transmitter 100 configured to transmit information, such as data, at actual information rates on the order of 100 to 125 Mb/s, or lower or higher. Those skilled in the art will appreciate that this actual transmission rate must account for overhead, such as conventional error correction, clock synchronization signals, and so forth. As such, the rate with which the data is transmitted will be somewhat lower (for example, 100 Mb/s). Although Figure 1 illustrates a transmitter, those skilled in the art will appreciate that the transmitter can be configured as part of a transceiver which includes both a transmitter (such as that of Figure 1) and a receiver.

The exemplary Figure 1 embodiment is configured to produce a power output on the order of 0.5 to 2 W using four parallel 0.5 W channels. Despite using four (or more) separate channels, overall circuit complexity is actually decreased. For example, high power (e.g., 0.5 W) monolithic millimeter wave integrated circuits (MMICs), previously used in radar technology, can be used in the transmitter and receiver portions of a transceiver according to exemplary embodiments of the present invention to achieve full duplex, high power wireless communications with a simple circuit design. The high power outputs and fast information transmit/receive rates enable the use of wireless communications for broadband networking technologies and interconnectivity medium standards such as the synchronous digital hierarchy (SDH) known as the synchronous optical network SONET/SDH (e.g., SONET ring architectures having self-healing ring capability). Using available MMICs, such as high quality, low noise MMIC amplifiers, a five decibel (dB) noise figure or lower can be realized in a receiver portion. A transmitter configured using one or more MMICs can be used in conjunction with a receiver of the transceiver to provide point-to-point full duplex operation at operating frequencies in a fixed wireless spectrum range of 18-

40 GHz (e.g., on the order of, for example, 20 GHz to 40 GHz) or wider, in contiguous 50 megahertz (MHz) segments (or any other specified operating frequency range), over a range of the order of 2 kilometers (km) with, for example, 40 dB range attentuation or higher. As such, exemplary embodiments are suitable for a variety of applications including, but not limited to, point-to-point wireless communications between computers, such as between personal computers, between computer networks and between mainframe computers over broadband networks with high reliability.

The Figure 1 transmitter 100 includes means for performing at least one of modulating and demodulating information signals. Because Figure 1 illustrates a transmitter portion of a transceiver, a modulating means is illustrated which includes a data input means 102, a data processing means 104 and a power output means 106. The transmitter 100 further includes a means for information transmission/reception, the information transmission/reception means including an isolation means for information transmission with a first polarization. The information transmission/reception means is illustrated in Figure 1 as a radio frequency output 108.

The transmitter 100 can be configured using high power monolithic millimeter wave integrated circuits. Although a plurality of separate integrated circuits are available to implement the various functions of the Figure 1 embodiment, those skilled in the art will appreciate that all of the functions implemented by monolithic millimeter integrated circuits in Figure 1 can be configured onto a single substrate to further enhance compactness. Moreover, all components used to implement the Figure 1 transmitter (i.e., any monolithic millimeter wave integrated circuit components, as well as any remaining components, including any voltage regulator, an antenna, a modem, a local oscillator, and so forth) can be configured on a single substrate to further enhance compactness.

The data input means 102 includes an intermediate frequency input 110 for receiving information (such as data) modulated on an intermediate frequency over an information input channel from, for example, a modem via an intermediate frequency on the order of, for example, 2-3 GHz. The modem can, for example, be configured in accordance with a SONET optical carrier standard like OC-3 or be a Fast Ethernet

modem (e.g., 100 Mb/s), or any other modem. A local oscillator (LO) input 112 is provided via a separate input of a local oscillator input channel. The local oscillator input can be on the order of, for example, 18 GHz, and can be received from any available exciter, or can be received from an exciter as configured in accordance with an exemplary embodiment to be described with respect to Figure 6.

The data can be received via a microstrip line to coaxial connector (e.g., K-connector) 114, which provides a first output of the data input means 102. The gain at each point along the transmission paths of Figure 1 illustrate the gain for a particular element with an arrow, the cumulative gain being shown above the path. Numbers illustrated vertically on the drawings constitute absolute power levels. Each of the vertical numbers (power levels) is determined by using the gain or loss of the component in between each of the numbers. For example, a -3 dB input power level relative to one milliwatt which occurs at the input to the connection link 114, is reduced by the -1 dBm of the insertion loss (I.L.) of the microstrip line to coaxial connector, to produce a -4 dBm loss at the output of the connection 114. The output from the connection 114 is supplied to a modulator 124 of the data processing means 104. The modulator 124 can, for example, be an upconverter which produces an output with a frequency that is higher than the frequencies of either input to the upconverter, or can be any other type of modulator.

The local oscillator input 112 can be supplied to a microstrip line to coaxial connector 116 via an amplifier which, for example, provides a 10 dB boost to the signal. The output from the connection 116 can be supplied to an amplifier 118 which boosts the signal by, for example, 12 dB. In exemplary embodiments, all amplifiers used in the transceiver can be available high power monolithic millimeter wave integrated circuit amplifiers. The output can be supplied to a frequency multiplier (2 times multiplier) 120, also configured as an available monolithic millimeter wave integrated circuit. The output from the frequency multiplier is supplied to a bandpass filter 122 to provide a second input from the data input means 102 to the modulator 124. In the Figure 1 embodiment, filters and attentuators are not configured using MMICs. For example, the filters and attentuators, can be configured using